

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method for constructing a color gamut for a plurality of colorants used in a color image reproduction system, comprising the steps of:

establishing a forward model for the color image reproduction system, the forward model characterizing the correspondence between combinations of the plurality of colorants and resulting colors in a color space;

generating a set of inkvectors defining combinations of colorants in colorant space wherein each inkvector comprises two colorants that are allowed to vary freely between their respective minimum and maximum values, the remaining colorants being fixed at one of a maximum or a minimum value;

using the forward model ~~to map~~ for mapping the set of inkvectors into said color space an inkvector coordinate into a color space coordinate; and

generating a plurality of gamut contours for a plurality of lightness levels in the color space wherein generating a gamut contour for a lightness level comprises:

identifying a subset of inkvectors for the lightness level wherein the lightness range for each inkvector of the subset includes the lightness level;

identifying a pair of endpoint coordinates in the color space for each inkvector of the subset of inkvectors for the lightness level wherein the pair of endpoint coordinates for an inkvector correspond to endpoints of a line formed by the intersection of the inkvector plane mapped to the color space and a lightness plane of the color space corresponding to the lightness level;

identifying boundary coordinates from amongst the
endpoint coordinates for the subset of the inkvectors; and
forming the gamut contour for the lightness level by
connecting the boundary coordinates.
~~selecting a subset of the mapped set of inkvectors that~~
~~define boundaries of the color gamut.~~

2. (original) A method according to claim 1, comprising a further step of identifying at least one color in a color image to be reproduced that is outside the boundaries of the color gamut.

3. (original) A method according to claim 2, comprising mapping the at least one identified color to produce a color that is on or inside the boundaries of the color gamut.

4. (original) A method according to claim 3, comprising a further step of reproducing the color image on the color image reproduction system.

5. (original) A method according to claim 1, wherein establishing the forward model comprises:
generating a plurality of test patches on a medium, each test patch corresponding to a specific combination of colorants;
measuring a color value for each of the test patches; and
fitting the color values to a suitable basis function.

6. (original) A method according to claim 5, wherein the color value is measured using a spectrophotometer.

7. (original) A method according to claim 6, wherein the color value is measured in CIELAB color space.

8. (original) A method according to claim 1, wherein the colorants comprise printing inks.

9. (original) A method according to claim 1, wherein the colorants comprise xerographic toners.
10. (cancelled)
11. (original) A method according to claim 1, wherein the set of inkvectors comprise all possible combinations of the plurality of colorants.
12. (original) A method according to claim 1, wherein the boundaries of the color gamut are constructed for each of a plurality of planes of constant lightness in said color space.
13. (original) A method according to claim 12, wherein a plurality of boundary nodes are identified for each plane of constant lightness, the method further comprising the step of determining a plurality of intervening points between adjacent pairs of the plurality of boundary nodes.
14. (cancelled)
15. (original) A method according to claim 1, wherein the plurality of colorants comprise at least three colorants.
16. (original) A method according to claim 1, wherein the plurality of colorants comprise less than eight colorants.
17. (original) A general purpose computer processor configured to perform the method of claim 1.

Claims 18-23 (cancelled)

24. (currently amended) A computer program product for constructing a color gamut for a plurality of colorants used in a color image reproduction system, the computer program product comprising a computer

readable storage medium having a computer program stored thereon for performing the steps of:

establishing a forward model for the color image reproduction system, the forward model characterizing the correspondence between combinations of the plurality of colorants and resulting colors in color space;

generating a set of inkvectors defining combinations of colorants in colorant space wherein each inkvector comprises two colorants that are allowed to vary freely between their respective minimum and maximum values, the remaining colorants being fixed at one of a maximum or a minimum value;

using the forward model ~~to map~~ for mapping the set of inkvectors into said color space an inkvector coordinate into a color space coordinate; and

generating a plurality of gamut contours for a plurality of lightness levels in the color space wherein generating a gamut contour for a lightness level comprises:

identifying a subset of inkvectors for the lightness level wherein the lightness range for each inkvector of the subset includes the lightness level;

identifying a pair of endpoint coordinates in the color space for each inkvector of the subset of inkvectors for the lightness level wherein the pair of endpoint coordinates for an inkvector correspond to endpoints of a line formed by the intersection of the inkvector plane mapped to the color space and a lightness plane of the color space corresponding to the lightness level;

identifying boundary coordinates from amongst the endpoint coordinates for the subset of the inkvectors; and forming the gamut contour for the lightness level by connecting the boundary coordinates.

~~selecting a subset of the mapped set of inkvectors that define boundaries of the color gamut.~~

25. (cancelled)

26. (new) A method according to claim 1 wherein establishing the lightness range for an inkvector comprises:

identifying a pair of inkvector coordinates wherein each coordinate includes a maximum value for one freely varying colorant and a minimum value for the other freely varying colorant;

mapping the pair of inkvector coordinates to said color space; and

determining the lightness range based on the lightness values of the mapped pair of inkvector coordinates.

27. (new) A method according to claim 1 wherein identifying the pair of endpoint coordinates in the color space for an inkvector of the subset of inkvectors for the lightness level comprises:

identifying a plurality of inkvector coordinates wherein each mapped inkvector coordinate comprises a lightness value corresponding to the lightness level; and

selecting the pair of endpoints from the plurality of inkvector coordinates wherein the value of one freely varying colorant is a relative maximum and wherein the value of the other freely varying color is a relative minimum.

28. (new) A method according to claim 1 wherein identifying boundary coordinates from amongst the endpoint coordinates for the subset of the inkvectors comprises:

identifying an interior coordinate based on the endpoint coordinates;

identifying a first boundary coordinate as the coordinate furthest from the interior coordinate; and

identifying other boundary coordinates based on the geometrical relationship between the first boundary coordinate, an interior coordinate and the endpoint coordinates for the subset of inkvectors.

29. (new) A method according to claim 4 wherein identifying other boundary coordinates based on the geometrical relationship between the first boundary coordinate, an interior coordinate and the endpoint coordinates for the subset of inkvectors comprises:

(a) selecting the first boundary coordinate as the reference coordinate;

(b) identifying a coordinate system comprising a first line connecting the reference coordinate and the interior coordinate as the y-axis and a second line perpendicular to first line and intersecting the reference coordinate as the x-axis;

(c) identifying at least one candidate line wherein a candidate line connects the reference coordinate and an endpoint coordinate located in either the first or fourth quadrants of the coordinate system;

(d) selecting a next boundary coordinate from the at least one candidate line having the smallest counterclockwise angular displacement from the x-axis; and

(e) repeating steps (b) to (d) with the next boundary coordinate selected as the reference coordinate until selecting the next boundary coordinate selects the first boundary coordinate.